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A NEW SUBSPECIES OF THE CALIFORNIA BOA, WITH NOTES ON THE GENUS LICHANURA

BY

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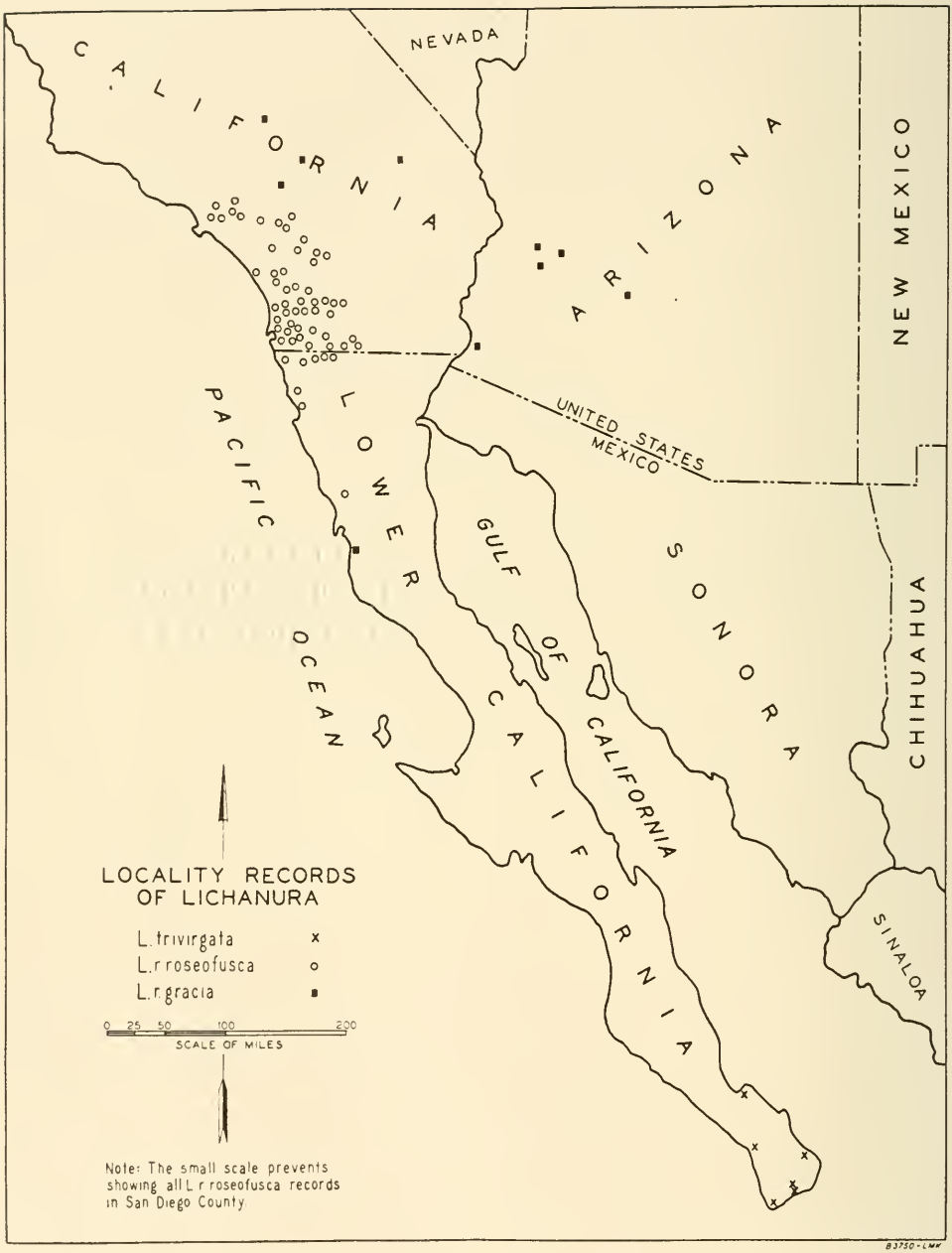
NEVADA
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OF
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SONORA
CHIHUAHUA
SINALOA
LOCALITY RECORDS
OF LICHANURA
L. trivirgata
L. r roseofusca
L. r gracia
0 25 50 100 200
SCALE OF MILES
Note: The small scale prevents
showing all L r roseofusca records
in San Diego County.
B3750-LMH

A NEW SUBSPECIES OF THE CALIFORNIA BOA, WITH NOTES ON THE GENUS LICHANURA

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Van Denburgh in the "Reptiles of Western North America," 1922, Plate 58, pictures a boa from near Aguila, Maricopa County, Arizona. This strongly striped snake had long remained a puzzle to me, for out of more than two hundred and fifty specimens from southern California and northern Lower California, Mexico, I had never seen so definitely marked an individual. Additional material has lately become available which convinces me that there is a consistent difference between the typical form as it exists in the coastal area centering at San Diego, and the desert or desert mountain individuals from the Mohave Desert (California), western Arizona and north-central Lower California. This new form may be known as

Lichanura roseofusca gracia subsp. nov.

DESERT BOA

Plate 21, fig. 1.

Type.—No. 2995 in the collection of L.M.K. Taken at Randsburg, Kern County, California, by Miss Lucile Rector, June, 1930.

Diagnosis.—A subspecies of *Lichanura roseofusca* differing from the typical form in having three clearly and evenly outlined reddish stripes on a drab background from nose to tip of tail. In *roseofusca roseofusca* the stripes, if present, are highly irregular in outline and in slight contrast with the ground color. *L. trivirgata* of the Cape region of Lower California has chocolate brown stripes, with a cream ground color, in even stronger contrast than *gracia*, and a lower ventral scale count as well. Additional specimens from central Lower California may eventually show both *roseofusca* and *gracia* to be subspecies of *trivirgata*, *gracia* being intermediate between the other two.

Description of Type.—Young female. Length over all, 375 mm.; length of tail, 45 mm.; ratio of tail to total length, 0.12.

The head is arrow-shaped, flat topped and covered with small scales which are smooth and irregularly disposed. The head dimensions are 18 mm. by $10\frac{1}{2}$ mm. The rostral is high, prominent and recurved. The nasals are divided; the prenasals are large and meet on the median line. The supralabials are 15—15,

the third being tallest. The infralabials are 17—17, the first pair meeting on the median line. The loreals are 3—2 with 3 subloreals on each side.

The eye is surrounded by a ring of 9 scales on the right and 8 on the left. Two suboculars on each side are in contact with the supralabials. The scales of the body are smooth and in 43 rows. The ventrals number 232 and are narrow; the anal is entire; the caudals are in a single series of 42. The tail tip is blunt.

The pattern consists of three longitudinal stripes, a dorsal and two side stripes, each five scales wide at mid-body and separated by four scale rows. These stripes extend from nose to tail; their color (in alcohol) is Prussian Red[1] and that of the interspaces Pallid Brownish Drab. The red was considerably brighter in life. The dorsal and side stripes are faintly edged with darker. The stripe boundaries, except on the head, adhere quite closely to the edge of a single scale row, thus achieving a serrated appearance. The ground color, low down on the sides, is lighter than between the three primary dark stripes and, except for the first three scale rows below the dark side stripes, is mottled irregularly with brown, as is also the ventral surface.

The three main stripes are of irregular form on the head. The supralabials are almost immaculate; the underside of the head, including the lower labials, is sparsely spotted with brown.

The pupil is vertical. The tongue is black with white tips.

Range.—This subspecies is known to occur in the following localities:

CALIFORNIA

Kern County
Randsburg (Type locality)

San Bernardino County
Barstow
Banks of the Mohave River, north of Victorville
Providence Mountains

ARIZONA

Maricopa County
Phoenix
Aguila

Yuma County
Harquahala Mountains
Harcuvar Mountains
Gila Mountains

LOWER CALIFORNIA, MEXICO

6 mi. S. of Socorro (near Lat. 30°)

The latter locality is only tentatively included. Thus the indicated range is the Mohave Desert in California and the mountains of southwestern Arizona, with a possible extension into north-central Lower California. The subspecies has not yet been taken in Riverside, Imperial or San Diego Counties in California, but may occur in the desert mountains, especially in the Chocolates and to the northeast of the Imperial-Coachella-Salton Basin.

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[1] The colors are from Ridgway, 1912.

General Description and Remarks.—The following specimens of this subspecies have been examined:

LMK	2995	Randsburg, Kern Co., Calif. (Type)
CAS	35348	Aguila, Maricopa Co., Ariz.
MVZ	10523	Barstow, San Bernardino Co., Calif.
SDSNH	14202	Gila Mts., Yuma Co., Ariz.
USNM	20643	Harquahala Mts., Ariz.
USNM	20953	Harquahala Mts., Ariz.
USNM	29698	Phoenix, Ariz.
USNM	44317	Providence Mts., San Bernardino Co., Calif.
USNM	60238	Harquahala Mts., Ariz.
SDSNH	15511	6 mi. S. of Socorro, Lower California (tentative)

Through the courtesy of Mr. Chas. M. Bogert, a photograph has been seen of a specimen, which is clearly of this form, from the Mohave River near Victorville.

All specimens which have been available from the Mohave Desert, or Arizona, have fallen into this classification, based on pattern and color; and no specimen of the genus (out of over two hundred seen) from other areas, with the exception of SDSNH 15511, has answered to this description. All available material therefore favors a valid geographical race.

Statistical comparisons with *L. trivirgata* and *L. roseofusca roseofusca* are as follows:

	Trivirgata	*Gracia*[2]	*Roseofusca*
Number of Specimens	7	9	38
Scale rows, range	40—43	40—43	35—43
Scale rows, average	41.4	41.3	40.9
Ventrals, range	218—227	220—236	221—244
Ventrals, average	222	230	232
Caudals, range	42—46	42—49	39—51
Caudals, average	44	46	47
Supralabials, range	12—13	13—15	12—15
Supralabials, average	12.8	14.1	14.1
Infralabials, range	13—15	14—17	13—17
Infralabials, average	13.8	15.4	15.0
Oculars, range	9—11	8—11	7—10
Oculars, average	9.7	9.8	9.1

[2] Does not include SDSNH 15511.

It will be observed that *trivirgata* has a low average in ventrals, caudals and labials and therefore possesses real differences from the others in scutellation; on the other hand *gracia* and *roseofusca* are virtually indistinguishable in scale counts.

Priority of Names in the Genus Lichanura

Lichanura is an exceedingly variable genus in both lepidosis and coloration and, as a result, a number of species have been proposed from time to time based on characteristics which have failed to prove consistent. The following notes will summarize the situation:

Lichanura trivirgata Cope 1861, Proc. Acad. Nat. Sci. Phila., 1861, p. 304. Type locality Cape San Lucas, Lower California. Valid.

Lichanura roseofusca Cope 1868, Proc. Acad. Nat. Sci. Phila., 1868, p. 2. Type locality northern Lower California. Valid.

Lichanura myriolepis Cope 1868, Proc. Acad. Nat. Sci. Phila., 1868, p. 2. Type locality northern Lower California. This species Cope seems to have differentiated from the preceding based on the large number of scale rows (45) and "three rusty red bands extending throughout the length, but very indistinct on the anterior half of the body." Stejneger[3] examined the type specimens of *roseofusca* and *myriolepis* and found the scale rows of the latter to be 43, rather than 45 as reported by Cope. He noted the colors to be "not more distinctly marked than all the other specimens found to the north," that is the four specimens of *roseofusca* from San Diego County which were available to him in 1891. He therefore concluded that the species was invalid. I do not believe this form anticipates *gracia,* as the stripes are stated to be indistinct anteriorly, which is not the case in the new subspecies. Cope's type of *myriolepis* was a juvenile, and young specimens of *roseofusca roseofusca* frequently have rather distinct longitudinal stripes for at least part of the length, but their lateral edges are extremely irregular instead of even as in *gracia.* Had the type of *myriolepis* been as brightly and distinctly marked as the specimens I have referred to *gracia,* Dr. Stejneger would not have observed it to be similar to the San Diego County specimens of *roseofusca.* The first *gracia,* an Arizona specimen, was not added to the National Museum collection until two years after the publication of his paper from which the above quotation is taken.

Lichanura orcutti Stejneger 1889, Proc. U. S. Nat. Mus., Vol. 12, p. 96. Type locality Colorado Desert, San Diego Co., Calif. This species was differentiated from *roseofusca* by the low number of scale rows and true loreals. It has since been determined that the characters in the type of *orcutti* are well within the range of *roseofusca.* I have had specimens from the center of *roseofusca* territory with 35 scale rows and 2 loreals. The late C. R. Orcutt informed me that the type specimen of *orcutti* was collected east of Jacumba. I have secured

[3] Proc. U. S. Nat. Mus., Vol. 14, p. 511.

several specimens of *roseofusca* from this vicinity; these differed in no uniform character from others in the San Diegan area.

Lichanura simplex Stejneger 1889, Proc. U. S. Nat. Mus., Vol. 12, p. 97. Type locality, San Diego, Calif. This species was distinguished by the low number of oculars. With additional material available two years later, Stejneger himself decided (Proc. U. S. Nat. Mus., Vol. 14, p. 511) that this species was invalid.

Thus we find that none of these forms can anticipate *gracia;* they were taken in *roseofusca roseofusca* territory and fall within the range of character variations of that form. Only *myriolepis* is mentioned as having stripes and Stejneger's re-examination of the type and his comparison with *roseofusca roseofusca* are conclusive on this point.

COLOR NOTES ON LICHANURA

Trivirgata, as has been stated, has three primary stripes of dark chocolate brown on a light drab background. The central dark stripe varies from 3 to 5 scales in width at midbody and the side stripes from 4 to 6. The interspaces are from 3 to 4 scales wide, and may contain dark edged scales. The boundaries of the three primary dark stripes adhere closely to single scale rows, but have a way of splitting scales diagonally, resulting in a sharply serrated border. Below the dark side stripes the ground color of the sides, and the ventral surface are spotted with black.

Roseofusca roseofusca is exceedingly variable in both color and pattern. Fundamentally, the pattern, particularly in the young, is reminiscent of the three primary dark stripes of *trivirgata,* from which, no doubt, it was originally derived, but these stripes are not strongly in evidence for two reasons: First, the ground and pattern colors in *roseofusca roseofusca* are less strongly contrasting, particularly in adult specimens, than in *trivirgata;* and secondly, the stripes, when present, have indefinite and irregular lateral borders, the interspaces between being more or less filled with scattered red brown scales.

The colors of *roseofusca roseofusca* are primarily two, a red brown pattern color and a metallic blue-gray ground color, both of which vary rather widely in tone and hue. The pattern color varies from pink or salmon to a dull brown. The ground color is sometimes a bluish, sometimes a steel or leaden gray; it is lighter in young specimens and those from the desert edge. The pattern color may be relatively distinct in irregular streaks or patches, or it may blend with, or entirely obliterate, the ground color; thus the snake may appear unicolor, being either a dull red brown or gray brown. The smooth scales combined with the color produce, in life, a metallic effect.

Thus, by these changing combinations of the two colors, and an obsolescent pattern, we have a high degree of variability, but never amongst all the specimens of this form that I have seen, from the coastal foothills of the San Bernardino and San Jacinto ranges, and the desert fringes of the latter, have I observed a specimen of the *gracia* type, with even edged, regular and strongly contrasting stripes. It may be noted that, in *roseofusca roseofusca,* specimens will occasionally be found in which the lower edges of the side stripes are evenly and clearly defined, but this will not be the case with the upper edges of these stripes nor the borders of the dorsal stripe.

Gracia is a snake having the pattern of *trivirgata* together with the pattern color and scale counts of *roseofusca roseofusca.* The ground color is lighter than *roseofusca,* although approached by desert edge specimens of the latter.

The dorsal stripe is from 4 to 5 scales wide, the interspaces from $3\frac{1}{2}$ to 5 and the side stripes 4 or 5 wide. The lower edges of the side stripes may be uneven. The sides and the ventral surface are mottled with darker. Sometimes the mottling on the sides is sufficiently even to resemble additional pairs of stripes.

The Arizona specimens are somewhat lighter in color than those from California.

SDSNH 15511, from 6 mi. S. of Socorro, Lower California, is an unusual specimen. In ventral scale count it resembles *trivirgata* for the ventrals number 217; the labials are high, however, being 14—14, 16—16. The stripes are quite even; the interspaces between the red primary stripes are steel blue. Thus, this specimen has some of the characteristics of all three forms; superficially it more resembles *gracia* and is tentatively placed in that category. Additional specimens from this vicinity will be awaited with interest. Typical *roseofusca roseofusca* has been collected only 40 miles[4] to the north of Socorro; the nearest *triviragata* thus far recorded is from La Paz, over 500 miles to the south, and between these two are territories of a character not likely to be inhabited by boas.

Except for SDSNH 15511, of uncertain status, true intergrades

[4] L. M. Huey informs me that a faunal break is to be expected in this short distance; it is evident in the mammals and birds, the species to the north being San Diegan while those to the south have affinities with Arizona or Lower California forms. The same break occurs amongst the gopher snakes (*Pituophis catenifer annectens* and *Pituophis vertebralis*) and the rattlesnakes (*Crotalus confluentus oreganus* and *Crotalus enyo*), the southern forms coming as far north as Cataviña and El Marmol.

between *roseofusca* and *gracia* have not yet come to light. They are to be expected along the northern fringe of the San Bernardino Mountains in the vicinity of Hesperia and eastward. Specimens from the lower edges of the desert mountains in San Diego County, particularly in the vicinity of Yaqui Well and The Narrows, may be considered intergrades to the extent of having sharply contrasting colors, but the stripes show no tendency toward regularity or even borders. (Plate 21, fig. 2).

HABITS AND HABITAT

Lichanura is the most peaceful snake with which I have had experience. Freshly captured specimens seem to be without fear; they are never hurried in their movements nor attempt to bite. When hurt they assume the defensive by rolling into a ball.

Of *trivirgata* I have seen no live specimen and of *gracia* only one (the type). But with *roseofusca roseofusca* I have had a considerable field and laboratory experience.

While this subspecies seems to prefer the granite-chaparral association of the coast foothills in San Diego County, it ranges from the ocean shore to the lower fringe of the desert foothills, although probably absent from the intervening mountain peaks above the 4500 ft. contour. Although it is no doubt largely crepuscular or even nocturnal in habit, it is by no means unusual to find it abroad and active in the daytime, particularly in the spring.

Some field notes follow:

April 10, 1923: One was found crossing the road at 10 A. M.; chaparral on both sides.

April 15, 1923: A specimen was braced in a crack between granite boulders directly above, and evidently watching a wood rat's nest.

May 25, 1924: Found a specimen in a crack in a granite boulder.

March 22, 1925: At 11 A. M. a large specimen was found climbing up the bank of a roadside. Chaparral on one side, rocks on the other.

April 19, 1925: A large individual was located under a flat rock covering a small circular pocket in a large boulder.

March 28, 1926: One was found with head and one third of the body under a flat rock, the rest of the body being in the open.

April 11, 1926: Found one under a small flat rock.

April 20, 1927: Located one in a crack in a granite boulder. Fished it out with difficulty.

June 4, 1927: In the later afternoon a juvenile specimen was found crossing a paved road. Rocks and brush at the roadside.

September 11, 1928: Noted a specimen from Tujunga Canyon, Los Angeles County, which was salmon (almost orange) in color.

April 11, 1931: Saw a specimen from Box Springs Canyon, Riverside County, with irregular orange-yellow stripes.

The late John Burnham, an amateur ornithologist, told me of finding one of these snakes stretched across a hillside trail. He prodded it with his foot, whereupon it gathered itself into a ball. The hillside being steep, it started to roll, and soon gathering momentum was lost to sight in the brush below.

Specimens in captivity spend considerable time in the branches of any available bush. They do not seem to use constriction in killing their prey. Birds and mammals appear to be their favorite food, but they do not feed readily in captivity.

The longest specimen I have seen measured slightly over three feet. The spurs at the vent are sometimes clearly in evidence but again are not apparent. The tail is often exceedingly blunt as if a portion had been lost, and the scale counts occasionally indicate this to be the case.

In an eight year census, boas constituted 3.4 percent. of the snakes collected in San Diego County and ranked ninth in frequency out of the twenty-nine species to be found in the county. *Lichanura* seems to reach its maximum activity in June, when 31 percent. of the specimens were taken, having a somewhat later peak than most of the species. Forty percent. of the specimens were taken in the foothills, the inland valleys following with 35 percent. Amongst the specimens found dead in the road, crushed by automobiles, 36 percent. were juveniles.

Ranges

Trivirgata has been taken in the following localities: Cape San Lucas (Type locality), La Paz, Santa Anita, Todos Santos, Eureka, and San José del Cabo. All of these points are in the Cape region of Lower California.

Roseofusca roseofusca has been collected at the following points:

Lower California

Garcia, Tecate, Lindero, Ensenada, Valle Redondo, 5 mi. S. of Tia Juana, Rancho Chichiuas (17 mi. N. of Ensenada), and 5 mi. W. of San José (Lat.31°). The last is the most southerly station.

Imperial County

1 mi. E. of Mountain Spring

SAN DIEGO COUNTY

Agra
Encinitas
Rancho Santa Fe
Linda Vista
Murphy Canyon
Pacific Beach
Grantville
Mission Valley
San Diego
National City
Chula Vista
San Ysidro
Fallbrook
Pala
Monserate
Bonsall
Moosa
Escondido
Pine Mountain
San Pasqual
Bernardo
Hodges Dam
Poway
Mussey
Foster
Miramar
Twin Oaks
El Monte
Lakeside
Flinn Springs
Santee
Mission Gorge
El Cajon
Murray Dam
Dehesa
Helix
Spring Valley
Jamacha
Rainbow
Red Mountain
Rincon
Valley Center
Henshaw Dam
Santa Ysabel
Sutherland
Pamo
Witch Creek
Ballena
Hatfield Creek
Ramona
Earl
Wildwood
San Vicente
Cajon Peak
Ritchie Creek
Eagle Peak
Viejas
Descanso
Alpine
Suncrest
Pine Valley
Japatul
Glen Lonely
Jamul
Mt. San Miguel
Buckmans
Deerhorn Flat
Dulzura
Cottonwood
Potrero
Tecate
Campo
Newtown
San Felipe
Culp Valley
Sentenac Canyon
The Narrows
La Puerta
Dos Cabezas
Boulevard
Jacumba
Mountain Spring

From these data it would seem that in San Diego County the species ranges from the coast line eastward to the lower edges of the desert foothills, but excluding the mountains above 4500 ft.

RIVERSIDE COUNTY

Banning
Hemet Grade
Cabazon
Palm Canyon
Box Springs Canyon
Palm Springs
Gavilan
SanJacinto
San Jacinto Mts.

San Bernardino County

Live Oak Canyon, near Redlands
Near San Bernardino
Cucamonga Canyon
San Bernardino Mts.

Los Angeles County

Tujunga Canyon
Mt. Wilson
San Gabriel Mts.
Hollywood Hills
Eaton Wash, near Pasadena
San Gabriel Wash, near Azusa
Sierra Madre, at 1700, 1900 and 2500 ft.
Arroyo Seco

Gracia:

The collection localities of this subspecies have been given on page 308 above.

Key

Key to the species and subspecies of *Lichanura*.

A. Longitudinal stripes, if present, have edges uneven (zig-zag) and ill defined ..... *roseofusca roseofusca*

AA. Longitudinal stripes are present and with even (but serrated) edges.

B. Longitudinal stripes dark chocolate brown, ventrals average 222 ..... *trivirgata*

BB. Longitudinal stripes red brown; ventrals average 230 ..... *roseofusca gracia*

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PLATE 21

Fig. 1. *Lichanura roseofusca gracia.* Desert Boa.
CAS 35348. Collected near Aguila, Maricopa Co., Arizona, May, 1912. (Photograph by courtesy of the California Academy of Sciences)

Fig. 2. *Lichanura roseofusca roseofusca.* California Boa.
LMK 4282. Collected at The Narrows, San Diego Co., California, March 15, 1931. (Desert edge specimen showing tendency, in contrasting colors, toward *L. r. gracia*)

Fig. 3. *Lichanura roseofusca roseofusca.* California Boa.
LMK 4380. Collected at Campo, San Diego Co., California, April 7, 1931. (Coloration typical of coastal specimens)